Announcement of Opportunity for Collaboration
Sustainable Seas Expeditions

Introduction
The National Geographic Society's *Sustainable Seas Expeditions* (*SSE*) is a five-year, public-private effort to use manned submersibles to explore the coastal waters of the United States, with emphasis on the nation's National Marine Sanctuaries. Dr. Sylvia Earle, National Geographic Explorer-in Residence will lead the expeditions whose goals are to create awareness of the inextricable link between human health and ocean health, to inspire an ocean ethic, to assist in the development of ocean monitoring protocols, and the establishment of a national system of ocean monitoring sites.

SSE has been funded by an initial grant from the San Francisco-based Richard & Rhoda Goldman Fund, complemented by additional financial and outreach support from the National Geographic Society. The National Oceanic and Atmospheric Administration (NOAA) has committed personnel, ship support, and other in-kind services and expertise. Since the announcement of the program on April 23, 1998, several leading institutions have indicated their willingness to provide additional assistance to *SSE*, including the US Navy, NASA (Mission to Planet Earth), Jason Foundation, Monterey Bay Aquarium Research Institute, Monterey Bay Aquarium, Mote Marine Laboratory, Center for Marine Conservation, SeaWeb, Education Management Group, and the Woods Hole Oceanographic Institution.

SSE will be organized into three phases over the period 1998-2003. Phase I, April 1998 through December 1999, will begin with project planning, submersible pilot training and its first field season. During the 1999 field season, two *DeepWorker* submersibles will be used to explore the twelve marine sanctuaries with emphasis on better understanding species composition and abundance as well as to assist in developing sanctuary program monitoring protocols.

In Phase II, January 2000 to December 2002, the project will extend the characterization of sanctuary habitats, focusing on large pelagic animals (including whales, sharks, rays, and turtles) and comparing habitat requirements among sanctuaries. The project will begin implementation of monitoring protocols and will visit no-take zones to check on system health or change.

In Phase III, January to December 2003, the project will shift focus from exploration and data gathering to data analysis and interpretation. A major campaign will be focused on public outreach and education. A final project

report will document findings and recommendations for future or continued exploration and data gathering.

Through this Announcement, the program continues to actively solicit partnerships with other government agencies, private foundations, academia and industry to broaden the collaborative effort.

Purpose of this call for collaborative projects
During this planning phase, we seek collaboration with researchers who actively work in marine sanctuaries in an effort to complement and partner with those engaged in exploration and research related to resource management in marine protected areas. Such research might include investigation of refuges from commercial harvesting, documentation of critical cultural sites, obtaining baseline data on species distribution and abundance, documentation of rare or essential habitat or species, etc.

We are interested in collecting as much information as possible regarding ongoing or recently completed monitoring projects within the marine sanctuaries. *SSE* may be used to extend the range of an ongoing monitoring project, complement an existing project with additional data, or develop a new exploration, monitoring, or research project.

This call for collaborators is aimed at bringing forward those projects for which the *DeepWorker* submersibles could be a tool to conduct research in the National Marine Sanctuaries.

Opportunities provided by *SSE*
For selected projects, *SSE* will provide time on the *DeepWorker* submersibles or support vessels to assist in collecting data for ongoing deep-water research projects. Other researchers may be interested in having scientists from the *SSE* team collect data in the deep water range that complements data collected from shallow sites (<100 ft.).

The National Geographic Society may assist researchers through its print, internet and television media capabilities. Use of these capabilities may allow some research or monitoring projects to be highlighted through the National Geographic Society and other partners.

NOAA and NASA will make available remote sensing, oceanographic and climatic data where useful to support research objectives.

SSE is also interested in identifying collaborators who, although they may not choose to directly use *DeepWorker*, would like to combine their research with that conducted via the submersibles. For example, a scientist may be conducting deep water research on a west coast fishery, and would like to

obtain information on similar species that will be studied by the *SSE* in an east coast marine sanctuary.

Finally, *SSE* would like potential collaborators to consider the five-year planning horizon of the expeditions, and suggest possible projects that might be in the early stages in project design.

Research focus areas
The outline below is to assist researchers to develop a plan for collaboration with *SSE*. There are three components to the expeditions: (1) exploration (2) developing ocean observatory and monitoring sites, and (3) research on a resource management issues. Components implemented in specific sanctuaries will depend on the project reviews and site priorities.

(I) Ocean Observatory and Monitoring Sites
These monitoring sites will vary in complexity depending on the resources available at each Sanctuary. It is likely that certain instruments will be installed at each site to measure important water quality parameters (e.g. temperature and organic contaminants), but, though it should be repeatable, detailed biological assessments will be site specific and vary in extent.

The purpose of this *SSE* research component is to assess long-term trends in Sanctuary resources, particularly in relation to infrequently visited habitats (i.e., > 100 ft.). Projects should address the *SSE* goal of establishing field monitoring stations and address the National Ocean Conference (NOC) and Marine Sanctuary Division (MSD) interest in characterizing ocean resources.

(II) Exploration
Exploration could include diving in shallow to deep water, at the Marine Observatory site and elsewhere, using video and narration to describe the biology, habitats and other unique observations. Long term observations at one location (e.g., continental shelf edge or kelp forest) should also be considered. Some sites may have cultural or biologically unique sites to be explored. This aspect of the project will be implemented in the field by the SSE Project Director, Sanctuary staff, and/or guest specialists.

The purpose of this *SSE* research component is to document the resources of the National Marine Sanctuaries and capture the imagination of the general public. This project should address the *SSE* and NOC goal of exploring the Sanctuaries using submersibles, provide appropriate material for the National Geographic Society partner and general education programs, and assist in the MSD priority of documenting natural and cultural resources.

(III) Research on a Resource Management Issue
These projects will vary with specific research needs at each site (contact local Research Coordinators), and the results of this Announcement. The purpose

of this SSE project component is to address priority issues of the MSD (i.e., marine protected areas and cultural resources) and address the overriding theme of SSE, linking ocean health to human activities.

Specifications of the *DeepWorker* submersible

DeepWorker is a one-person, one-atmosphere, Directly Operated Vehicle (DOV) with the capacity to dive to 2000 feet. It is completely tetherless in normal operation, but can be fitted with an optic fiber cable of lead-pencil size for video or data transmission. Dive length depends battery power, but typically lasts from 4-6 hours. DeepWorker is capable of both day and night operations.

Nuytco Research Inc., the designers of *DeepWorker*, have over two decades of experience with submersibles design and were involved in the early development of the first work-class ROV (Saab-Sub), the ADS Jim, Jet-Jim, Wasp, Deep Rover, Sea Urchin Sea Otter and Remora.

Vehicle specifications:

Length	8.25 ft. (2.4 m)
Beam	5.3 ft. (1.6 m)
Height	4.5 ft. (1.35 m)
Weight in air	0.9 tons
Operating Depth	2000 ft. (600 m)
Payload	250 lb. (114 kg)
Life Support	106 person hours
Speed	3 - 4 knots max.
Accommodation:	1 person (pilot)

Systems Description:

- Pressure Hull: 36 inch sphere attached to a 24 inch diameter by 18 inch long cylinder. Manufactured of A516 grade 70 steel with 316 steel hatch rings
- Power Source: Two 16 inch diameter battery pods, each containing 10 high-ampere, deep cycle, AGM batteries. Nominal voltage 240/24/12.
- Maneuvering Control: Two main 1 H.P. thrusters, plus two angled 1 H.P. vertical thrusters, angled sufficiently to give lateral control. 200 c. ft. ballast air provided to fill constant volume tanks.
- Life Support: Two oxygen cylinders carried externally. Two redundant, mechanical oxygen controllers with electronic monitoring (analog back-up) internal. Carbon dioxide removed via two scrubbers. Emergency breathing gas via air BIBS. Life support exceeds four days. Rescue of a trapped DOV can be made by a ROV, a second DOV, a submersible flown in on a "Subsmash" program, or any combination. If none of these recovery options are available, the pressure hull is separable from the frame and battery pod and would rise to the surface.
- Viewing: Single 26 inch vision dome which serves as entry hatch.

- Sonar: "Modified" Imaginex switchable from standard scan to ultra high resolution short range scan. Directional hydrophone.
- Manipulators: Equipped with "Newt-Arms", anthropomorphic, water powered manipulators. Standard reach 7 feet, extendible to 14 feet. Multi-function, with wrist lights and video standard.
- Communications: Surface- ICOM VHF; Sub-Surface- Orcatron UQC and 27 KHZ.
- Optional Equipment: Tracking beacon, Xenon strobe, pinger, magnetometer, burial/excavation pumps, sampling equipment, including an ability to measure salinity and temperature, precision laser measuring system, pipe tracker, explosive attachment life bag salvage modules, U/W cutting module, hydraulic cutters/tools, and a variety of photographic equipment.

Obligations of researchers

All researchers intending to operate the *DeepWorker* submersible must complete training hosted for *SSE* by the Monterey Bay Aquarium Research Institute, near Monterey, California. For each pilot, training will be one week in duration during the period October 5 -- December 15, 1998. Training sessions will include classroom instruction, practice sessions in large tanks, and training in the open ocean. *SSE* cannot provide travel, meals or lodging to obtain this training.

Depending on the number of research projects selected and the special needs of pilots, we intend to train enough people to complete projects selected for the first year of *SSE* during this initial training period. Additional training opportunities will occur later in the project for pilots who may not dive until later years.

Specific qualifications for pilots will be made available to selected researchers. At this time we are requesting potential pilots to identify previous experience both in submersibles and as well as SCUBA. In addition, we will need to know if a proposed research project requires that specialized equipment be mounted on the submersible for conducting underwater research.

If the potential collaborator does not intend to pilot *DeepWorker*, but nonetheless needs *SSE* to assist in ongoing research, adequate information on the project will have to be provided so that another pilot/scientist is able to collect requested data.

Collaborators will be asked to submit three reports on their progress and findings. During each site visit, all researchers will be provided a Quick-Look Report form, which should be complete by the end of the visit. The Quick-Look Report provides project and sanctuary staff with a brief summary of activities, significant findings, an evaluation of the expedition, and recommendations for project modification. Collaborators will also be asked

to submit six-month and twelve-month reports on their projects, and should include, where appropriate, recommendations related to science and management in national marine sanctuaries. They will also be notified of annual information transfer workshops. These workshops offer the opportunity to present papers or project summaries and attend discussions on other *SSE* project activities.

Submittal requirements
Please complete the attached form and submit the information either electronically (preferable) or in hard copy (if in hard copy, please submit three [3] copies of the proposal). Your submission may include ancillary material (e.g. reprints, if appropriate) or additional pages, but should be as brief as possible. Although the deadline to submit this information is August 31st, submissions are encouraged at any time before this date.

Please note that the Sustainable Seas Expeditions does not provide direct financial assistance for research projects.

Disposition of data

During the expeditions, the Mission Chief will be responsible for the data quality, disposition and archiving of data and samples collected aboard the ship for the primary projects. Copies of these data will be provided on request to participants on the cruise and to any other requesters.

The Commanding Officer will provide the Mission Chief with a single copy of all data collected by ship's personnel. The Mission Chief will provide the Commanding Officer a list of all data collected by the scientific party.

For NOAA sponsored cruises, oceanographic data sets and related information collected are considered to be in the public domain per requirements of the Federal Ocean Data Policy and NOAA Administrative Order 216-101. Principal investigators will have the opportunity to process, analyze or publish their own data sets but it will be understood that data bases will eventually be available to the larger scientific community within 2 years and archived at the National Ocean Data Center (NODC).

Principal Investigators, for each project are required to submit an inventory of data collected within 60 days of collection and a data set for archival within 2 years of collection.

Video and still imagery collected during the expeditions shall remain the property of the SSE, but copies will be made available on request to Principal Investigators.

Review process
Proposal review will involve: (1) an initial screening for completeness and alignment with project goals by the Science Team of the National Marine Sanctuary Program, (2) review by marine sanctuary staff (in collaboration with local science advisory committee or colleagues) and the SSE project team, and (3) review of recommended proposals by a small project technical advisory committee. Annual review workshops are planned as part of the Sustainable Seas Expeditions as an outreach mechanism allowing scientists and other interested parties to learn about project findings, to revise future project plans and to discuss how to apply the findings to improve ocean conservation and management.

Review schedule

July 15, 1998	Distribution of Announcement of Opportunity for Collaboration by sanctuaries and SSE team
August 31, 1998	Proposals due - address correspondence to: Dr. Steve Gittings, Science Coordinator NOAA/Sanctuaries Division SSMC-4, N/ORM2 1305 East West Hwy., Rm. 11535 Silver Spring, MD 20910 email: sgittings@ocean.nos.noaa.gov
September 1, 1998	Distribution of proposals received to marine sanctuaries and project team for initial review
September 5, 1998	Initial review completed; recommendations forwarded to SSE Advisory Committee
September 9, 1998	Review of recommended proposals by SSE advisory Committee
September 14, 1998	Notification of selected collaborators of proposal status and pilot candidate selection

***SSE* Schedule - Phase I**

October - December 1998	Pilot training in one-week sessions
January 19 - 22, 1999	Scuba Dive Expedition of the American Samoa NMS
April 1 - 19, 1999	Expedition begins with *DeepWorkers* at Monterey NMS
April 20 - May 7, 1999	Channel Islands NMS
May 8 - 25, 1999	Gulf of the Farallones NMS
May 25 - June 10, 1999	Cordell Bank NMS
Late June/early July, 1999	Olympic Coast NMS
July 14 - 21, 1999	Monitor NMS
July 27 - August 10, 1999	Gray's Reef NMS

August 15 - 30, 1999	Flower Garden NMS
TBD in August, 1999	Scuba expedition at the Thunder Bay NMS
September, 1999	Florida Keys NMS
October, 1999	Stellwagen NMS
November, 1999	NGS/NMS Expedition Workshop
Winter, 1999	Hawaiian Humpback Whale NMS

Project continues through 2003

Contact information

To discuss capabilities of submersibles and support vessels, contact Todd Jacobs (tjacobs@ocean.nos.noaa.gov)

To discuss the proposals or the proposal review process, contact Steve Gittings (sgittings@ocean.nos.noaa.gov)

To discuss the research priorities of the individual marine sanctuaries, contact the site directly. For contact information for the sites, call the Marine Sanctuaries Division at 301-713-3125 and dial "0."

To discuss education and outreach related to the SSE, contact Justin Kenney (jkenney@ocean.nos.noaa.gov)

To discuss the Sustainable Seas Expeditions and partners, contact Francesca Cava (Francesca_Cava@hazmat.noaa.gov)